

# User-Oriented Services Model

Steve Kempler

GSFC Earth Sciences (GES) Data and Information Services Center (DISC) Manager

January 31, 2002

This paper responds to the following SEEDS provided questions:

**Are their additional or better levels of service for any of the requirements that you would recommend?**

**How do you see levels of service for active archive products changing for LTA? Are service levels a cost driver for active and LTA?**

Specifying Levels of Service (LOS) for future ESE data and/or information centers (as being formulated by the SEEDs Team), and NASA Permanent Archives (PAs a.k.a. Long Term Archives or LTAs), share much commonality. LOS for the former can vary from center to center, but each center should reflect a well defined and agreed upon/expected criteria (e.g. level). Obviously, PAs also need to adhere to a well defined and agreed upon/expected LOS criteria. In both cases, a model, the same model, can be built that lists, in detail, the level of service in increasing for each type of service provided. This paper provides thoughts on defining LOS for a future ESE data centers and PAs, and a model for doing so.

## Data and Information Center Services

In Hunolt's SEEDs Workshop Papers, <http://www.westoverconferences.com/Seeds/SeedsPaperW1.pdf>, W2, and W3, he very suitably defines services in terms of Functional Areas. For each functional area, Mr. Hunolt specifies a set of requirements, and when appropriate, various levels of service that satisfy the requirement. In the second and third workshop papers, Mr. Hunolt begins to describe the various potential classes of future data centers in terms of the specified requirements/LOS, and actually assigns LOS to the data centers.

This is a very good beginning and grounds for flushing out service activities and associated LOS, that fall under each functional area. Thus, I look at this white paper as a contribution to the evolution of better defining and assigning data center LOS.

It should be recognized that each class of data center, and even each data center within a class, need not abide by a constant set of services. Beyond minimally required levels of service, data centers should have the flexibility to provide services consistent with their objectives and customer needs. Several factors go into the services and level of services that a data center provides, including:

- Popularity of the product (number of users to service)
- Types of users
- Accessibility of information about the product
- Type of information requested

- Usability of the product
- Usage of the product

Note that this implies that a Data Centers LOS is more efficiently derived on a dataset basis. Also note that funding was purposely left off the list. Provision of services should be center objective//customer driven, not funding driven.

Once an activity specific set of services and levels of services are specified, data centers can determine the services and levels of service they need to accommodate.

The LOS Model, described below, is an attempt to clarify and specify the realm of data center LOS, in a systematic fashion.

### **Data and Information Center Levels of Service (LOS) Model**

The LOS Model defined here is currently a prototype that addresses User-Oriented Services. These fall within the following data center activities:

- User Services
- Product Support
- Data Availability
- Data Access
- Long Term Data Stewardship

Loosely, but not totally, User-Oriented Services map to many aspects of Hunolt's Documentation, Distribution, User Support, Engineering Support, Implementation functional areas. User-Oriented Services were chosen to prototype because, overall, here lies activities with the greatest variability of service levels.

The LOS Model consists of a series of tables, one for each activity addressed (See Tables 1 to 5). Each table shows increasing levels of service for the given activity, information required of the data producer to facilitate each LOS, and skills, knowledge, experience needed to support each level of service. (As a working prototype, actual detail refinements are expected and invited.)

### **Intended Application of LOS Model**

This model is intended to assist the governing body of the future network of data centers to specify a minimum and required level of service by activity, that can dynamically evolve. It also allows data centers to tailor their specific services to service at higher levels. Thus, a data center, based on its objectives, can choose and commit to the level of service for each activity, as needed. Data centers can be certified at specific service levels based on some combination of levels of service they adhere to. Alternatively, the governing body can set standards per activity. Most important, a LOS Model provides data center flexibility, tracks commitment, and defines terms.

As mentioned earlier, the LOS Model is targeted at SEEDS derived implementations and PA. The model is intended to provide LOS a methodological way to be 'governed' across a network of data centers, not mattering what type of data center it is.

Table 1- Levels of Service for User Services

<b>SERVICES (Levels)</b>	<b>LEVELS OF SERVICE (higher levels include lower levels, but not lowest)</b>	<b>INFORMATION REQUIRED OF THE DATA PRODUCER</b>	<b>SKILLS/KNOWLEDGE/ EXPERIENCE NEEDED</b>
<b>USER SERVICES</b>			
Lowest	No Service	None	
Low	Telephone; E-mail	Science data point of contact; Data formats and organization	Keep records/metrics; User services personnel
Medium	On-line help; Perhaps FAQ; Data Support: Knowledge of data, able to solve technical, data, data structure questions	Algorithm Information (ATBDs); Data formats and organization; Data system specification/performance	Computer engineers; Scientists; Software developers; Expertise in data management systems, and data structures
High	Outreach; Conferences; Papers and Presentations	Science peer review of material when appropriate	Outreach personnel; Poster/presentation developers
Highest	Educational Material; Lectures and Seminars	Science peer review of material	Educators

Table 2- Levels of Service for Product Support

<b>SERVICES (Levels)</b>	<b>LEVELS OF SERVICE (higher levels include lower levels, but not lowest)</b>	<b>INFORMATION REQUIRED OF THE DATA PRODUCER</b>	<b>KNOWLEDGE/ EXPERIENCE/ SKILLS NEEDED</b>
<b>PRODUCT SUPPORT</b>			
Lowest	No Support; Unmaintained basic documentation	None	
Low	Documentation; Webpages with hyperlinks to metadata; Readme's; DIFs	Description of data files, collection, granule, and product level metadata, etc.; Product information; Product descriptions; Guide documents; Browse products; Product volume, restrictions, and quality; Science point of contact; Data format and access definition	Scientists; Software developers; Webmaster; Technical writers; Data specilaists
Medium	Science Support: Interpret data products; Develop or make available, tools to facilitate product usability and accessibility: e.g., format conversions, subsetting, data mining, additional distribution mechanisms	Science team consultation	Computer engineers
High	Development of value added products to meet the needs of users; Field campaign support to supplement current products; Product regeneration	Product generation software (i.e., PGEs) and complete documentation; PGE System requirements; PGE execution procedures, conditions, error handling, and initiation triggers	Science integrators
Highest	Center of Excellence concepts	Science peer review	Computer architects

Table 3- Levels of Service for Data Access

<b>SERVICES</b> (Levels)	<b>LEVELS OF SERVICE</b> (higher levels include lower levels, but not lowest)	<b>INFORMATION REQUIRED OF THE DATA PRODUCER</b>	<b>KNOWLEDGE/ EXPERIENCE/ SKILLS NEEDED</b>
<b>DATA ACCESS</b>			
Lowest	By phone or e-mail		
Low	By phone or e-mail; Crude interfaces; Primitive search and order; Substandard		Computer engineering
Medium	Fully serviced websites; Simple search and order (e.g., parameter, subsetting, etc.); Meets all standards	Product descriptions	Webmasters
High	Advanced search and order; Search by specific criteria (e.g., coincident searches, sensor information, day/night, etc.)	Information to allow for access by specified criteria	Data managers
Highest	Accessing data produced from user supplied data mining software	Data mining algorithms	

Table 4- Levels of Service for Data Availability

<b>SERVICES (Levels)</b>	<b>LEVELS OF SERVICE (higher levels include lower levels, but not lowest)</b>	<b>INFORMATION REQUIRED OF THE DATA PRODUCER</b>	<b>KNOWLEDGE/ EXPERIENCE/ SKILLS NEEDED</b>
<b>DATA AVAILABIL ITY</b>			
Lowest	Not available, or available under certain circumstances; One type of media distribution; Stored safely off line		
Low	Archived off line; Available within 2 weeks; Electronic and one type of media distribution		Computer engineers; Operators
Medium	Archived on or near line; Available within 2 days; Electronic and several types of media distribution (e.g., DLT, CD-ROM, 8 mm tape, etc.)		
High	Archived on or near line; Available usually less than 2 days; Employs alternative (wider range of) electronic distribution paths (e.g., DODS, web mapping testbed)		
Highest	Archived on line; Immediately available electronically		

Table 5- Levels of Service for Long Term Data Stewardship

<b>SERVICES</b> (Levels)	<b>LEVELS OF SERVICE</b> (higher levels include lower levels, but not lowest)	<b>INFORMATION REQUIRED OF THE DATA PRODUCER</b>	<b>KNOWLEDGE/ EXPERIENCE/ SKILLS NEEDED</b>
<b>Long Term Data Stewardship</b>			
Lowest	Keep data safe off line; Improve data access only when necessary; Media migration when needed; All required security	Data Security documentation	
Low	Keep data safe on or near line; Evolve data access with affordable changes; Media migration when needed; Technology (e.g., data formats, media) and infrastructure (e.g., system) analysis and migration when needed; All required security	Algorithm Information (ATBDs); Data formats and organization; Data system specification/performance; Data Security documentation	Computer engineers; Data specialists
Medium	Evolve data access with user needs and/or to meet standards; Technology analysis and migration when appropriate and/or to meet standards; Infrastructure analysis and migration to meet industry improvements		
High	Ensure data safety further with off site backup; Engage an advisory group to guide the data center in long term data stewardship planning		Scientists
Highest	Further ensure data stewardship through membership/participation in many standards committees, technology groups, etc.		